API-Shiny Pipeline

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Learning Objectives

At the end of this lesson, you should be able to. . .

- Gain insight into the role of a data scientist in industry
- Interact with simple APIs.
  - Find and read API documentation.
  - Submit a GET request for data.
  - Parse data from the API.
- Create simple Shiny applications.
  - Construct a UI function.
    - Understand the basics of a DOM (Document Object Model).
    - Understand the basic R functions that construct the DOM.
  - Construct a Server function.
    - Understand observe functions.
    - Understand render functions.
    - Understand reactive variables.

The Real World :)

Part of what a Data Scientist does is... Find data, assess data, analyze data, visualize data

Find Data

Boss: Find the latitude and longitude of all the Walgreens (US) and Boots (international) locations. When can you get this done?

Me: (Never worked with APIs, maps, geospatial analysis) . . .

Boss: When can you get this done?

Me: A week?

Assess Data

Me: I'm looking at this database table with clinical trial visit data, there's a column called randomization date indicator, but all the indicators are 0 (every trial must have a randomization date). Can you tell me more about why this is the case?

Database Owner/IT Chatbot: Negative. See. Owner. Of. Table.

Owner of Table/Overworked Project Manager: ¯\(")/¯

Me: (Guess I can't trust the data in that column. I wonder about the rest of the table. . .)

Analyze Data

Old School Industry Statistician: Here is a file with tens of thousands of comments from doctors about participation in clinical trials. Use NLP to find all the negative comments.

Me: (Proud, confident, having just read Tidy Text Mining) I can do a sentiment analysis on the comments, shouldn't take me too long!

Me: (Proud, returns with data) Here!

OSIS: Now use NLP to tell me why they are upset.

Me: (Unsure) Well I can do some clustering to see which comments are related...

OSIS: No, I want quotes from the actual comments that state the exact reason they are upset.

Me: (Looking at data - no labels, just free text)... I don't think NLP can do that ...

OSIS: (Frown)

Visualize Data

Me: (Demos fancy new visual for recruitment analysis)

Boss: This isn't sexy enough. I saw an application at a conference that has a spinny-globe loading screen, can you add that?

Me: Well... Maybe... I can try! ...But what does that have to do with the analysis?

Boss: SPINNY GLOBE! SEXY! BRING ME!

APIs

API stands for Application Programming Interface. Serves as a mediator. Takes as input a request in a very strict syntax. Request is parsed, and initiates some set of processes. Processes return data objects in a structured format - JSON, XML, etc.

Requests

httr package jsonlite package

GET

Me: (Goes to API's front door. Piles of data with my name on it sitting there.) Thanks API!
API: You're welcome, use the data wisely or you will be sued. Have a lovely day!

Example:

This request returns the state data aggregated over all time.

```
#Libraries
library(httr)
library(jsonlite)

#https://documenter.getpostman.com/view/8854915/SzS8rjHv?v
#set a GET request
covid_states_req <- GET("https://covidtracking.com/api/stat

status_code <- covid_states_req$status_code

#"good" request when status = 200.
```

POST

Me: (Goes to API's front door, door closed) Knock, knock. Here's my req- API: (Interrupting) Intruder! Intruder! Me: Oh, right right. (Puts eyeball up to optical scanner, completes secret knock knock pattern) API: Phew! OK, now what do you want? Me: (Sends list of exactly instructions.) API: (Scrutinizing) Looks to be in order. Here's your data. Use it wisely or you will be sued. Have a lovely day!

Including an example here, but we're not going to go over it.

```
#' Search Citeline for Protocol Information
#'
#' Searches Citeline Trial endpoint based on user input
#'
#' @param return_fields_lst a list of API fields to return
#'
#' @param search_fields_lst a list of API fields to filter
#'
#' @param operators_lst a list of API operators to apply t
```

API Tips and Tricks

Read the documentation! Use the verbose() option to troubleshoot.
Special Characters - either escape them with \ or use I()

Shiny

UI

Server

Reactive Variables

Observe Functions

Render Functions